

C L A I M S

1/ Compositions of polypeptides specific to pathogenic strains comprising at least one polypeptide of a first group, having a sequence selected in the group comprising the sequences of SEQ ID N° 1 to N° 66 or 133-145 and at least one peptide of a second group, having SEQ ID N° 159, or homologous sequences of polypeptides of the first group and/or the second group with a minimum of 25% of identity with the whole sequences of said polypeptides.

2/ The compositions according to claim 1, wherein the polypeptides of the second group have SEQ ID N° 159.

3/ The compositions of claim 1 or 2, wherein the polypeptides of the first group have SEQ ID N° 14, 15, 17, 21, 22, 23, 28, 29, 30, 32, 36, 38, 39, 41-44, 46, 49, 50, 52 to 55, 58, 60, 63 or 133-138.

4/ The compositions according to claim 1 or 2, wherein the combination of two polypeptides comprises polypeptide having sequence SEQ ID N° 159 and at least one polypeptide selected in the group comprising peptides having sequence SEQ ID N° 2, 26, 28, 36, 34, 134, 141 and 145.

5/ The compositions according to anyone of claims 1 to 4, wherein said homologues isolated antigenic polypeptides of the first group have at least 25% identity to a polypeptide having a sequence such as above defined in claim 1, more particularly having SEQ ID N° 14, 15, 17, 21, 22, 23, 28, 29, 30, 32, 36, 38, 39, 41-44, 46, 49, 50, 52 to 55; 58, 60, 63, 133-138, or at least 25% identity to a fragment comprising at least 5, at least 10, at least 20, at least 30, at least 40, at least 50, at least 60 or more than 60 consecutive amino acids of a polypeptide having a sequence corresponding to said SEQ ID N°s, as determined using BLASTP or BLASTX with the default parameters.

6/ The compositions according to anyone of claims 1 to 5, wherein said homologous isolated antigenic polypeptides of the second group have at least 25% identity to a polypeptide having SEQ ID N° 159.

5 7/ Use in combination of isolated polynucleotides coding for a polypeptide of the first group and of isolated polynucleotides coding for a polypeptide of the second group as defined in claim 1 according to the universal genetic code and taking into account the degeneracy of this code

10 8/ The use of claim 7, comprising polynucleotides coding for the polypeptides of said first group and having sequences corresponding to SEQ ID N° 67 to SEQ ID N° 132 or 146 to 158 in combination with polynucleotide having SEQ ID N° 160.

15 9/ The use of claim 8, comprising the nucleotides having sequences corresponding to SEQ ID N° 80, 81, 83, 87, 88, 89, 94, 95, 96, 98, 102, 104, 105, 107-110, 112, 115, 116, 118, 119, 126, 127, 130, 132, 135, 146-151 in combination with the polynucleotide having SEQ ID N° 160.

20 10/ The use of claim 7, comprising polynucleotides having SEQ ID N° 68, 92, 89, 94, 100, 154, 147 and 146 in combination with the polynucleotide having SEQ ID N° 160.

25 11/ The use of anyone of claims 7 to 10, comprising homologs of said polynucleotides having at least 25% identity to a fragment comprising at least 15, at least 30, at least 60, at least 90, at least 120, at least 150, at least 180 or more than 180 consecutive nucleotide of a polynucleotide having one of said SEQ ID N°s, as determined using BLASTN with the default parameters, inasmuch as they are capable of coding for a polypeptide having antigenic properties of those
30 according to the invention.

12/ An expression vector comprising at least one isolated polynucleotide coding for a polypeptide of said first group and at least one polypeptide of said second group according to the universal genetic code and taking into account the

degeneracy of this code, said groups being as defined in anyone of claims 1 to 6.

13/ The expression vector according to claim 12, wherein the polynucleotides coding for the polypeptides of the first group have sequences corresponding to SEQ ID N° 67 to SEQ ID N° 132 or 146 to 158.

14/ The expression vector according to claim 12 or 13, wherein said polynucleotides have sequences corresponding to SEQ ID N° 80, 81, 83, 87, 88, 89, 94, 95, 96, 98, 102, 104, 105, 107-110, 112, 115, 116, 118, 119, 126, 127, 130, 132, 135, 146-151.

15/ The expression vector according to anyone of claims 12 to 14, wherein the polynucleotide coding for the polypeptide of the second group has SEQ ID N° 160.

16/ The expression vector of anyone of claim 13 or 14, comprising polynucleotides having SEQ ID N° 68, 92, 89, 94, 100, 154, 147 and 146 in combination with the polynucleotide having SEQ ID N° 160.

17/ An expression vector according to anyone of claims 12 to 16, comprising an homolog to said polynucleotides, said homologs having at least 25% identity to a fragment comprising at least 15, at least 30, at least 60, at least 90, at least 120, at least 150, at least 180 or more than 180 consecutive nucleotide of a polynucleotide having one of said SEQ ID N°s, as determined using BLASTN with the default parameters, and are encompassed by the invention inasmuch as they are capable of coding for a polypeptide having the antigenic properties of those according to the invention.

18/ An expression vector according to claim 12, comprising polynucleotides having SEQ ID N° 68, 92, 89, 94, 100, 154, 147, 146 and the polynucleotide having SEQ ID N° 160.

19/ A host cell comprising an expression vector according to anyone of claims 12 to 18.

20/ Vaccine compositions specific to *E. coli* extra-intestinal infections, comprising an effective amount of at least one antigenic polypeptide or fragment thereof of said first group and at least one antigenic polypeptide or fragment thereof of the second group, with a carrier, particularly at least one polypeptide of SEQ ID N° 1 to SEQ ID N° 66 and 133-145 and homologous polypeptides, and at least one polypeptide of SEQ ID N° 159 and homologous peptides.

21/ The vaccine compositions of claim 14, for preventing urinary system infections, pyelonephritis, sepsis, bacteremia, neonatal meningitidis.

22/ The vaccine composition of claim 20 or 21, adapted to specific indication in combination with components directed against other bacteria, such as *S. Aureus* or group B *Streptococcus*, or other bacteria implicated in systemic infections.

23/ Compositions of antibodies specific to polypeptidic antigens of pathogenic strains particularly to extra-intestinal *E. Coli* strains, comprising combinations of antibodies directed against at least one polypeptide of said first group and antibodies directed against at least one polypeptide of the second group such as defined in anyone of claims 1 to 6.

24/ Compositions according to claim 23, wherein said antibodies are monoclonal antibodies.

25/ Pharmaceutical compositions comprising a combination of antibodies according to claim 23 or 24.

26/ Pharmaceutical compositions according to claim 25 comprising an effective amount of a combination of antibodies according to claim 23 or 24, for treating neonatal infections, in association with antibodies against *Staphylococcus aureus* and/or antibodies against group B *Streptococcus*.

27/ The use of a pharmaceutical composition according to claim 25 or 26 for treatment or prevention of severe infection due to Expec in neonates and patients at risk for such infections.

- 5 28/ Pharmaceutical compositions for alleviating and/or preventing and/or treating an undesirable growth of *E. Coli* comprising an effective amount of at least a composition according to anyone of claims 1 to 6, in combination with a pharmaceutically acceptable carrier.

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